

Assignment 2

Answer all FIVE (5) questions below using R, Python, SPSS, or MS Excel (note: if you wish to use any tools other than these listed ones, please inform me first to ensure that I am able to open and understand your work).

Your submission shall include:

- The working files (e.g. R scripts, Python codes, SPSS input and output files, worksheets, or others)
- Your final answers arranged and presented neatly in a doc file (MS Word, Google doc, pdf, or others)

Question 1 (3 marks)

A particular customer service staff receive service requests through only voice calls and text messages. According to past data, 75% of the incoming service requests are through voice calls. A random sample of 10 incoming service requests are selected.

- Produce the probability distribution of number of incoming service request through text messages in the sample.
- Find the probability that the sample contains at most 5 service requests through voice calls.

Question 2 (4 marks)

The life span of a brand of calculators has a normal distribution with mean 65 months and standard deviation 10 months.

- Produce the cumulative distribution of life span of the calculators for a reasonable range.
- Find the probability that a calculator of the brand will have life span at least 6 years.
- Find the minimum life span of the 20% most durable calculators of this brand.

Question 3 (4 marks)

A company has two restaurants in two different areas of a city. The company wants to estimate the percentages of customers who think that the food and service at each of these restaurants are excellent. A sample of 200 customers taken from the restaurant in Area A showed that 118 of them think that the food and services are excellent. Another sample of 250 customers selected from the restaurant in Area B showed that 160 of them think that the food and services are excellent. At 10% significance level, perform an appropriate hypothesis testing.

Question 4 (5 marks)

A company is considering to install new machines to assemble its products. The company surveys two types of machines, but eventually only one type will be bought. The company selected 10 assembly workers and asked them to use both types of machines to assemble products. The table below shows the time taken (in minutes) to assemble a fixed number of products using each type of machine.

Worker	1	2	3	4	5	6	7	8	9	10
Machine A	23	26	19	24	27	22	20	18	25	22
Machine B	21	24	20	25	24	28	24	17	26	20

Assuming that the population of time taken to assemble the products is approximately normally distributed. Perform a hypothesis testing that the time taken for both machines to assemble the products have the same variance. Then, perform another hypothesis testing to suggest which machine is recommended. Use 5% significance level for both tests.

Question 5 (4 marks)

A traffic officer claims that the number of cars at different seasons are highly associated with zones. Use the observed data below, test the officer's claim at 5% significance level.

Number of cars	Zone A	Zone B	Zone C
Peak Hours	150	255	395
Off-Peak Hours	50	45	105